Electricity Distribution Resilience Framework through West Coast Alpine Fault Scenario

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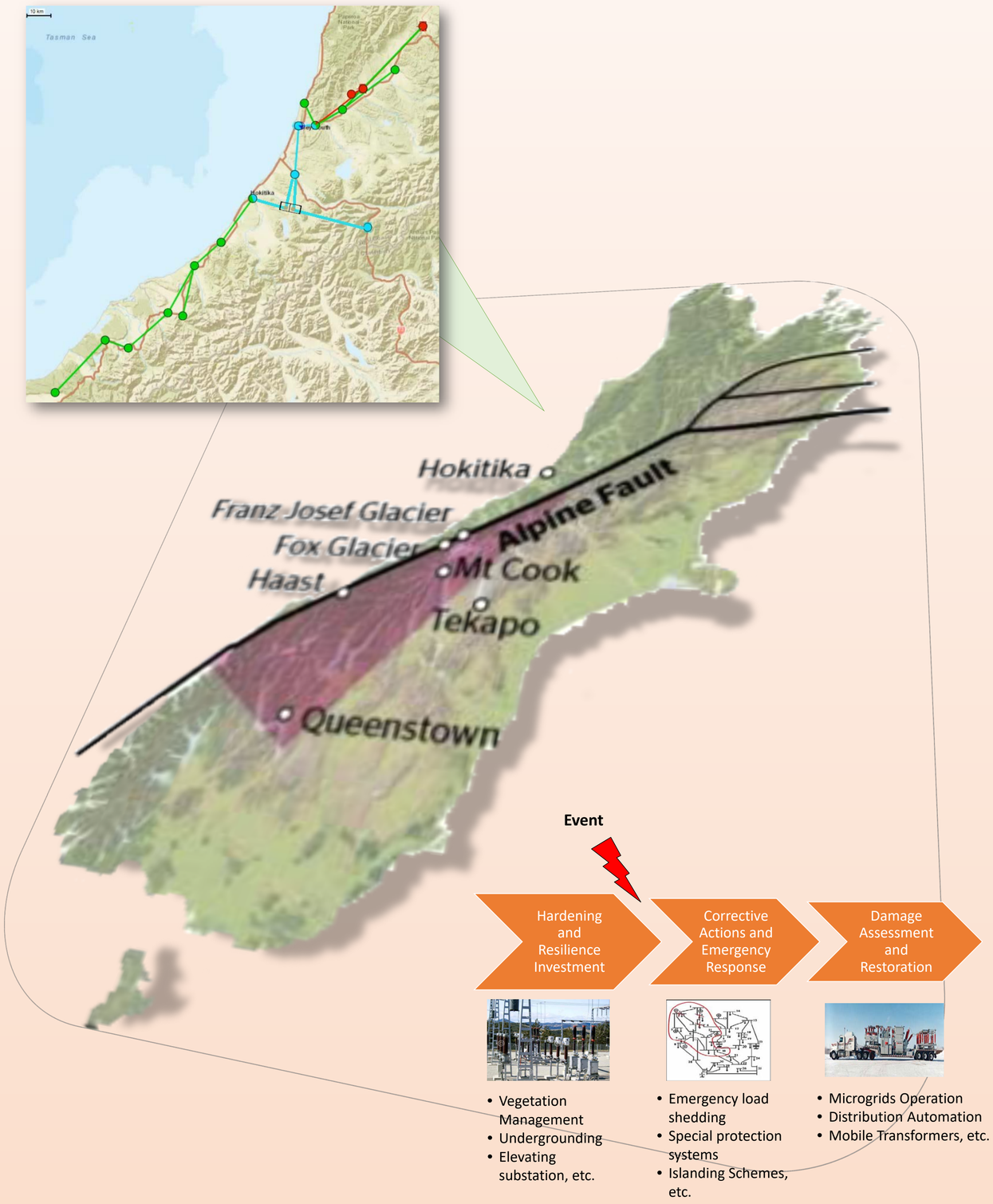

Assessing Micro-grid restoration for Westpower

Conventional Power system recovery

Generator Black Start → Transmission Reconfiguration → Load Restoration

Microgrid assisted Power system recovery

Down to Distribution

Transmission Level Restoration Process | Micro-grid Self healing and Restoration Process

Up to Transmission

Figure 6. Conceptual illustration of microgrid-aided power system recovery

- Islanding detection, Reconnection
- Generator stability, ControlRenewables

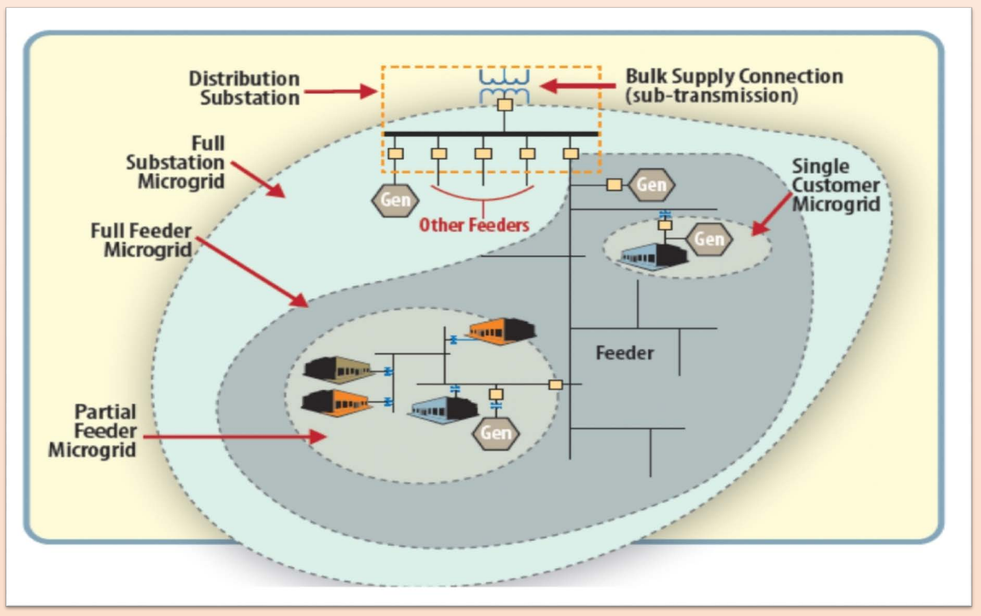

Figure 7. Conceptual illustration of microgrid operation [2]

Spatially mapping AF to Westpower distribution

- Impacts of ***four*** AF scenarios are mapped to Westpower distribution network.
- Components under study are transformers, cables, poles and isolators operated by Westpower.

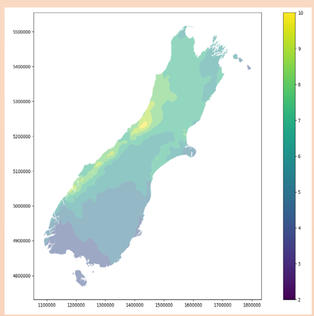

Figure 2. Scenario Alpine Fault 400m Southern Hypocenter

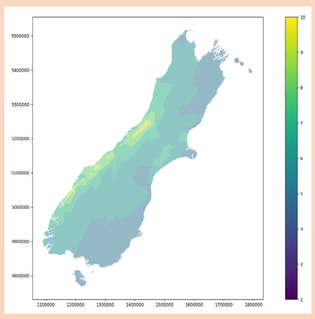

Figure 3. Scenario Alpine Fault 400m Northern Hypocenter

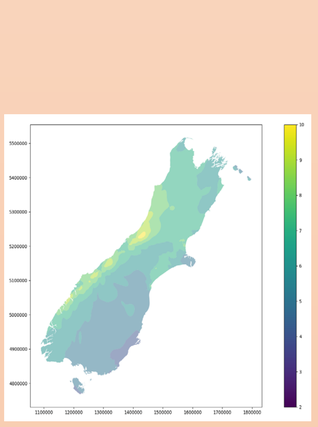

Figure 1. Scenario Alpine Fault 400m Central Hypocenter

Figure 5. Westpower MV Network [1]

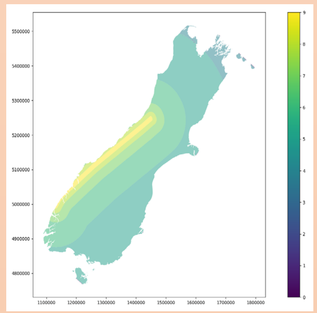

Figure 4. Scenario Alpine Fault 400m Empirical Southern Hypocenter

- ***Five*** situations with various network strengths are considered resulting in ***twenty*** scenarios.
- ***Nine*** out of the ***twenty*** scenarios are identified as potential feasible islanding topologies.

Communication Assessment during AF for West Coast

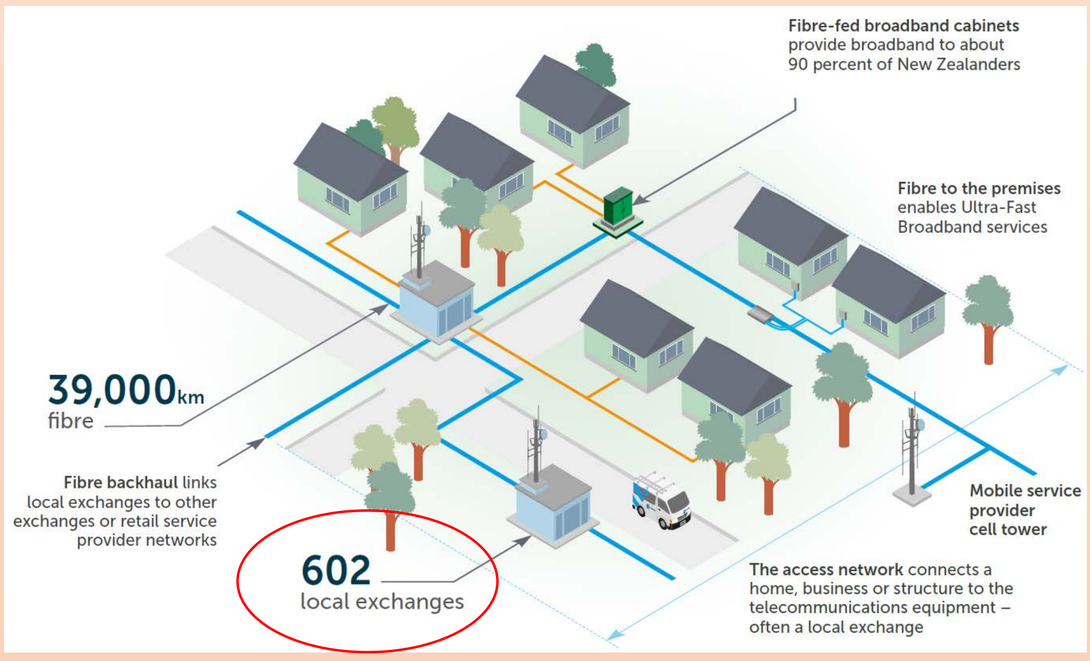

Figure 8. Chorus Network [3]

The brain of the Communication network are Exchanges or central offices which are still work in isolated or local mode in some cases during and after the disaster. The focus of this project is on this critical component of overall communication lifeline.

Policies, Guidelines, & Engagement

- Dissemination of resilience preparedness and energy-communication synergies during major future events
- Conduct facilitated meetings with other utilities to collate a coordinated response from AF case study of Westpower
- Conduct a RNC workshop to transfer the electricity-communication interdependency and resilience learnings following natural hazards to other infrastructure researchers and stakeholders

References
[1] Westpower asset management plan, 2018.
[2] The Role of Microgrids in Helping to Advance the Nation's Energy System, U.S. Department of Energy.
[3] Chorus Annual Report, 2017.